Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (Currently amended) An image forming apparatus, comprising:

an ink storage section for storing ink therein;

an ink supplying path for supplying, to a print head, the ink stored in the ink storage section; and

an electrode for detecting whether the ink is present or absent in the ink supplying path, wherein

an amount of the ink supplied into the ink supplying path per minute is such that a predetermined S/N ratio of a detection signal produced by the electrode is satisfied~~being 1.0cc or less per minute~~.

2. (Original) The image forming apparatus as set forth in Claim 1, comprising:

a filter in the ink supplying path, the filter having a water-repelling property.

3. (Original) The image forming apparatus as set forth in Claim 2, wherein:

the filter has a mesh shape.

4. (Original) The image forming apparatus as set forth in Claim 1, comprising:

an ink cartridge that is detachable,

the ink cartridge containing the ink storage section inside thereof; and

an ink absorbing body in the ink storage section, the ink absorbing body being porous and retaining the ink therein,

the image forming apparatus satisfying:

$$\eta \cdot N \cdot R \cdot B > 2 \cdot \gamma \cdot h,$$

where η (N/m) is a surface tension of the ink, N(cells/m) is a cell density of the ink absorbing body before contained in the ink storage section, R is a compression ratio that is a ratio between (a) a volume of the ink absorbing body after contained in the ink storage section, and (b) a volume of the ink absorbing body before contained in the ink storage section, γ is a specific gravity of the ink, h (m) is a maximum water head of the ink in a perpendicular direction with respect to an ink supply outlet of the ink storage section under arbitrary orientation, and B is a coefficient = 4.08×10^{-4}.

5. (Original) An image forming apparatus, comprising:

an ink storage section for storing ink therein;

an ink supplying path for supplying, to a print head, the ink stored in the ink storage section; and

an electrode for detecting whether the ink is present or absent in the ink supplying path,

the image forming apparatus satisfying:

$$(4 \cdot Q/(\pi \cdot d))/\nu \leq 2,$$

where $\nu(m^2/s)$ is a dynamic viscosity of the ink, d(m) is a diameter of the ink supplying path, Q (m^3/s) is an average ink supply amount.

6. (Original) The image forming apparatus as set forth in Claim 5, comprising:

an ink absorbing body in the ink storage section, the ink absorbing body retaining the ink; and

a filter in the ink supplying path,

the image forming apparatus satisfying:

$$4 \cdot \eta/DN - |Ph| > 4 \cdot \eta/F' \geq |P\mu| + |Pi|,$$

where: $P\mu = (k/a)\cdot\{\mu\cdot L\cdot(N\cdot R)^2/S\}\cdot Q$,

Ph(Pa) is a water head pressure between an ink spraying outlet of a nozzle of the print head and an ink supply outlet of the ink storage section,

Pi(Pa) is a water head pressure created in the ink storage section in supplying the ink to the print head via the ink supply outlet of the ink storage section when the ink storage section is full of the ink,

$P\mu$(Pa) is a pressure loss due to viscous drag of the ink in the ink storage section,

F(m) is a filtration accuracy of the filter,

DN(m) is a diameter of the nozzle of the print head,

η(N/M) is a surface tension of the ink,

N is a cell density of the ink absorbing body before being contained in the ink storage section,

R is a compression ratio that is a ratio between (a) a volume of the ink absorbing body after contained in the ink storage section, and (b) a volume of the ink absorbing body before contained in the ink storage section,

$S(m^2)$ is a cross section area of the ink absorbing body contained in the ink storage section in a compression state, and

L(m) is a height of the ink absorbing body contained in the ink storage section in a compression state,

(where coefficient (k/A) = 485, and F' = F in case the filter has round openings, or F' = $\sqrt{2}\cdot F$ in an other case).

7. (Original) The image forming apparatus as set forth in Claim 5, comprising: a filter in the ink supplying path, the filter having a water-repelling property.

8. (Original) The image forming apparatus as set forth in Claim 7, wherein: the filter has a mesh shape.

9. (Original) The image forming apparatus as set forth in Claim 5, comprising:

an ink cartridge that is detachable,

the ink cartridge containing the ink storage section inside thereof; and

an ink absorbing body in the ink storage section, the ink absorbing body being porous and retaining the ink therein,

the image forming apparatus satisfying:

$$\eta \cdot N \cdot R \cdot B > 2 \cdot \gamma \cdot h,$$

where: η (N/m) is a surface tension of the ink,

N(cells/m) is a cell density of the ink absorbing body before contained in the ink storage section,

R is a compression ratio that is a ratio between (a) a volume of the ink absorbing body after contained in the ink storage section, and (b) a volume of the ink absorbing body before contained in the ink storage section,

γ is a specific gravity of the ink,

h (m) is a maximum water head of the ink in a perpendicular direction with respect to an ink supply outlet of the ink storage section under arbitrary orientation, and

B is a coefficient = 4.08×10^{-4}.

10. (Original) An image forming apparatus, comprising:

an ink storage section for storing ink therein;

an ink supplying path for supplying, to a print head, the ink stored in the ink storage section;

an electrode for detecting whether the ink is present or absent in the ink supplying path; and

first and second filters in the ink supplying path, the first and second filters having different filtration accuracies, the first filter located upstream to the second filter,

the second filter has a larger filtration accuracy than the first filter.

11. (Original) The image forming apparatus as set forth in Claim 10, wherein:

$F_1 < F_2 \leq \sqrt{2}F_1$,

where F_1(m) is a filtration accuracy of the first filter, and F_2(m) is a filtration accuracy of the second filter.

12. (Currently amended) The image forming apparatus as set forth in Claim 10, wherein:

$F_1 < F_2 \leq D_B$,

where F_1(m) is a filtration accuracy of the first filter, F_2(m) is a filtration accuracy of the second filter, and D_B(m) is a diameter of an air bubble created when an air bubble created in the ink supplying path passes through the first filter.

13. (Original) The image forming apparatus as set forth in Claim 10 wherein:

an amount of the ink supplied into the ink supplying path is 1.0cc or less per minute.

14. (Original) The image forming apparatus as set forth in Claim 10, wherein:

at least one of the first and second filters has a water-repelling property.

15. (Original) The image forming apparatus as set forth in Claim 10, comprising:

an ink cartridge that is detachable,

the ink cartridge containing the ink storage section inside thereof; and

an ink absorbing body in the ink storage section, the ink absorbing body being porous and retaining the ink therein,

the image forming apparatus satisfying:

$$\eta \cdot N \cdot R \cdot B > 2 \cdot \gamma \cdot h,$$

where: η (N/m) is a surface tension of the ink,

N(cells/m) is a cell density of the ink absorbing body before contained in the ink storage section,

R is a compression ratio that is a ratio between (a) a volume of the ink absorbing body after contained in the ink storage section, and (b) a volume of the ink absorbing body before contained in the ink storage section,

γ is a specific gravity of the ink,

h (m) is a maximum water head of the ink in a perpendicular direction with respect to an ink supply outlet of the ink storage section under arbitrary orientation, and

B is a coefficient = 4.08×10^{-4}.

16. (Original) The image forming apparatus as set forth in Claim 10, wherein:

at least one of the first and second filters has a mesh shape.

17. (New) The image forming apparatus as set forth in Claim 1, wherein the amount of the ink supplied into the ink supplying path is 1.0cc or less per minute.